

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1 and 4 are currently being amended. Claim 2 has been cancelled.

This amendment changes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1, 3 and 4 are now pending in this application.

Prior Art Rejections

Claims 1 and 3 were rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent Publication No. 2004/0245584 (“Murakawa”). Claims 2 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Murakawa in view of U.S. Patent No. 6,830,652 (“Ohmi”). In response, without agreeing or acquiescing to the rejection, Applicants have cancelled claim 2 and amended independent claim 1 to include the limitations of claim 2. Further, Applicants respectfully traverse the rejection for the reasons set forth below.

Applicants respectfully submit that Murakawa and Ohmi, alone or in combination, do not describe each and every element of the claims.

Independent claim 1 is directed to a “plasma processing method” wherein “said plasma processing method being characterized in that said process gas includes nitrous oxide gas and said nitrous oxide gas is introduced into the plasma whose electron temperature is less than binding energy 2.24 eV between a nitrogen molecule and an oxygen atom in said nitrous oxide, and characterized by introducing said plasma excitation gas into a process chamber from an upper shower plate, generating said plasma under said upper shower plate, causing said plasma to pass through a lower shower plate provided under said upper shower

plate so as to reach said object to be processed, and introducing said nitrous oxide gas from said lower shower plate into the plasma under said lower shower plate.” (emphasis added).

As background and without limitation to the claims, the Examiner is referred to Fig. 1 of the application as filed. According to one embodiment, nitrous oxide is introduced from the lattice-shaped shower plate 110. Since the binding energy between a nitrogen molecule and an oxygen atom is approximately 2.24 eV in nitrous oxide, it is possible to suppress excessive dissociation by introducing nitrous oxide gas through the process gas outlets of the lattice-shaped shower plate. Accordingly, the production of N_2 and O_2 caused by excessive dissociation of the nitrous oxide gas is suppressed and, hence, NO radicals and N_2O radicals that contribute to oxynitriding can be efficiently produced.

In contrast, the cited references do not disclose, teach or suggest each and every element recited in independent claim 1 as amended.

Murakawa is directed to a system and method for forming insulation film. However, as acknowledge by the Office Action on p. 3, Murakawa fails to disclose introducing nitrous oxide gas through the process gas outlets of the lattice-shaped shower plate. To cure the deficiency of Murakawa, the Office Action relies on Ohmi. Applicants disagree.

Ohmi is directed to a microwave plasma processing apparatus. Ohmi discloses that process gas is passed through a lattice-like shower plate. However, Ohmi fails to disclose, teach or suggest that the process gas passed through the lattice-like shower plate is nitrous oxide. For example, table 2 lists the process gases disclosed by Ohmi, none of which are nitrous oxide. Accordingly, the combination of the cited references fails to disclose, teach or suggest “introducing said nitrous oxide gas from said lower shower plate into the plasma under said lower shower plate” as claimed. As set forth above, by using nitrous oxide as the process gas it is possible to suppress excessive dissociation.

Accordingly, Applicants respectfully request that the rejection be withdrawn and independent claim 1 be allowed. Further, claims 3 and 4 depend from claim 1 and should be allowed for the reasons set forth above without regard to further patentable limitations contained therein.

If this rejection of the claims is maintained, the examiner is respectfully requested to point out where the above-mentioned features are disclosed in Murakawa.

Conclusion


Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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